NOTE: In answering these questions, do not copy-paste text from the articles. Use your own words.

1. (5 points) In the “Resource Allocation for Malaria Prevention” case:
   
   1. (1 points) Which problems are solved with the solution approach offered in this presentation?
   
   2. (2 points) What are the 3 heuristic variations in the solution approach? Why is it necessary to use 3 different heuristics?
   
   3. (2 points) What conclusions can we derive from the sensitivity analysis? What is the benefit of sensitivity analysis in this context?

2. (7 points) For this assignment, please read the following article:


   To download this paper, please open the page http://www.library.gatech.edu/search/databases.php and go to the database *Web of Science*, after you log in, search for *Optimization of community health* in *Title*.

   Answer the following questions based on your reading of the article:

   1. (1 points) What are the main services a community health center (CHC) should cover?
   
   2. (1 points) Why did the authors use estimated data instead of using real data?
   
   3. (1 points) Explain the motivation behind the objective function.
   
   4. If we change the objective function to minimizing the total operating cost:
      
      (a) (1 points) Write the new objective function using the notation in this paper.
      
      (b) (1 points) If a CHC $i$ should cover $K_i$ units of the weighted patients, write down the constraints associated with the weighted patients.
   
   5. (2 points) Why does the paper do sensitivity analysis on the budget constraint? What is the conclusion of this analysis?
3. (5 points) Please refer to the Waffle House Case Study and answer the following questions (Problem 4.3):

Suppose that the realized demand for generators is $D$ and the total quantity of generators purchased is $Q$. Estimates indicate that electricity will be out for three days in the event of a major hurricane and lost profit at stores unable to open is projected to be $5,000. Generators cost $1,000. Complete the following steps to analyze the generator procurement problem using an alternative objective, namely to minimize the maximum regret experienced. (Regret is defined as the difference between the realized cost of a procurement decision and the cost of an optimal decision that would have been made with a priori knowledge of the demand for generators.)

1. (1 point) Express the realized cost of a decision to purchase $Q$ generators, including procurement cost for generators and the cost of lost sales, in terms of $Q$ and $D$.

2. (1 point) If a planner knew a priori what the total demand for generators would be, what is the optimal cost the planner would incur? Express this cost in terms of $Q$ and $D$.

3. (1 point) Express the regret incurred as a result of a decision to purchase $Q$ generators when $D$ are actually needed in terms of these two variables.

4. (2 points) Using the expressions you developed, complete Table 5, which summarizes the realized costs and the regret of procurement decisions. In this scenario, assume that the maximum number of generators that could possibly be needed in a season is 16.

4. (3 points) Read the article *Can Steven Chu Win the Fight Over Global Warming?* by M. Grunwald, Time, August 23, 2009. http://www.time.com/time/world/article/0,8599,1916078,00.html. Answer the following questions based on your reading of the article.

1. (1 point) What are some of the plans that the current government shows interests in pursuing energy efficiency and carbon emission reduction?

2. (1 point) What are some of the low-emission game changers in Chu’s consideration?

3. (1 point) What are the facts that leads Chu to say *China will be the world’s largest producer of renewables by 2010*?